

ABSTRACT

This invention of a particle separator using laser optical pressure provides a device and method for the optical separation of microscopic particles (0.01 – 30 μm diameter). Separation is accomplished through a balance of forces: light interaction (momentum transfer) with the particles of interest generating optical pressure and the viscous drag force of an opposing fluid flow. Particles of larger effective size or higher refractive index will experience a greater optical force and may thus be separated from particles with a smaller size or refractive index. Application of this new laser optical separator to biological particles including bacteria and viruses now provides a new avenue for biomedical sample evaluation. Separating based upon the intrinsic properties of the particle allows apriori identification of previously unknown or unexpected particle types. The light-induced separation of chemically different species opens important new avenues for biomedical/biochemical separation.